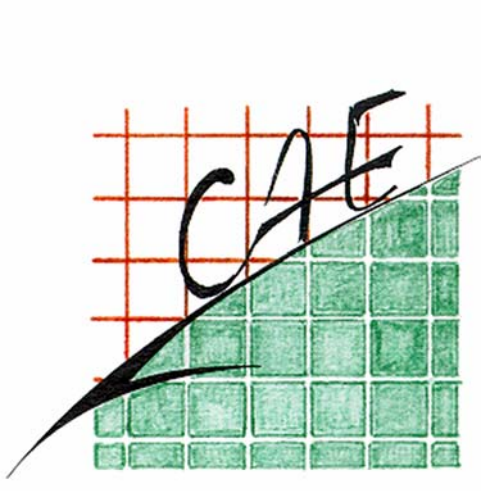

CENTRE AGRO-ENTREPRISE

Mali Sustainable Economic Growth

APPRAISAL OF THE SHALLOT SECTOR IN THE DOGON PLATEAU (PRODUCTION, CONSERVATION, TRANSFORMATION, COMMERCIALISATION & ORGANIZATION)
Contract No. 624-C-00-98-00012-00

Submitted to :
U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

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ABBREVIATIONS AND ACRONYMS

CAE :	Centre Agro-Entreprise
DRAMR :	Direction Régionale de l'Appui au Monde Rural
SLACAER :	Service Local Appui Conseil Aménagement et Équipement Rural
AFAR :	Action pour la Formation et l'Auto-Promotion Rural
PVAPD :	Projet Vulgarisation Agricole en Pays Dogon
BNDA :	Banque Nationale de Développement Agricole
COP/FOO :	Chargé des Organisations Paysannes / Farmer Organization Officer
GAAS –Mali :	Groupe d'Animation Action au Sahel
EST/DSS :	Echalote Séchée en Tranche/Dry Shallot Slices
AV/VA :	Association Villageoise / Village Association
RI :	Règlement Intérieur
USISS/SISDP :	Unité Semi-Industrielle de Séchage Solaire/Semi-Industrial Solar Drying Plant
Molibemo :	« Unissons-Nous » en Dogon / Let's get together (in Dogon language)
FS :	Fresh Shallot
RS:	Raw Shallo
GA:	General Assembly
APROFA :	Agence pour la Promotion des Filières Agricoles
GTZ :	Coopération Technique allemande
EO :	Economic Operator
MC :	Monitoring Committee
FAgt :	Field Agents
REEG :	Renewable Energy and Environment Group
Pro. :	(Service) Provider
CAE :	Centre Agro-Entreprise
GRP :	Group
Pr :	Promoter

A reminder about the terms of reference

I. OVERALL OBJECTIVE OF THE MISSION

To carry-out an appraisal mission on the shallot sector (EST production and fresh shallot production) in the Dogon plateau.

II. SPECIFIC OBJECTIVES

- To analyze current drying technology constraints (EST production) ;
- To propose technology improvement and, if necessary, a new drying technology so that EST would better meet market demand ;
- To define extension methods for the Retail-type conservation house for fresh shallot in Bandiagara (with reservation that a constraint identified during the mission is resolved).

III. EXPECTED RESULTS

- To propose improvement over the existing technology or identify a new technology which helps innovate EST production. This technology should help, on the one hand, to increase production over time and, on the other hand, provide Bandiagara EST with hygiene characteristics that are accepted in exports markets (AFNOR standards applicable in several countries of the Western and Central Africa sub-region). The proposed technology should comply with economic and environmental conditions of the Dogon Plateau ;
- To assess the need to introduce in the area a type of building with improved conservation characteristics for fresh shallot in order to increase storage capacities (reflection over the opportunity to introduce a strategy of scheduling sales over time) ;
- To propose a training program for better management of the proposed technology and of the marketing system ;
- To propose possible improvement of the existing system through better management of BNDA credits and stocks, membership in other organizations that are more representative and identification of new outlets.

I. Context of the mission

The conservation of agricultural products remains a concern for the authorities, considering the importance of economic stakes for Sahelian countries such as Mali. One of the objectives set forth by the Government of Mali and by CAE is to achieve quantitative progress in the field of biological food production.

To be sustainable, this development needs to build on information dissemination, extension of transformation activities and conservation processes for agricultural product, mainly market gardening products.

The challenge is such that CAE wishes to involve specialized consultant services to implement a support program for the shallot sector.

Produced in the areas of Bandiagara and Niono, shallot is a major source of income for the population. Therefore, its transformation and conservation have been important stakes for the extension program in the Dogon country.

Considered as an economic opportunity in the sector, improved drying of this product was introduced by the PVAPD with GTZ funding.

Of course, progress achieved allowed for the emergence of a type of actors whose specificity is that they benefited from a community development type of assistance. Today, the difficulty lies in defining clearly the type of support to be provided to these new types of producers, considering the current context of budget restriction for the former and new focus of donors whose support is geared towards the emergence of other professional actors who are aware of the economic stakes.

What remains of the 35 village groups of dryers supported by the PVAPD ?

- In terms of production, transformation, organization and marketing technology.
- What are the limitations and constraints in general for the sector ?
- What type of support should be provided to producers or other actors in the sector ?

These are important issues, which will be addressed in this report.

II. Methodology

The mission was carried-out using the following methodology :

A first step consisting in the review and analysis of literature about the agricultural extension project and various shallot transformation techniques.

A second step of scheduling and determining field missions with the CAE team.

A third step of discussions in the field with beneficiary groups and technical services.

A forth step of feedback and validation of results obtained in the field, with the CAE team.

Finally, the last step consisted in establishing contact with direct actors involved in the sector in order to validate the results obtained during the mission.

A previously developed interview guide helped collect essential data about the sector. Whenever possible, site visits based on a sample of 35 villages helped perform physical verification of information collected. Finally, technical proposals were submitted to further research.

III. Appraisal of the shallot sector

3.1 Results of an Agricultural Extension Project in the Dogon Country (PVAPD) 1985 - 2000

Draught in the 1970's caused significant decrease in agricultural production. To mitigate its consequences, Mali and GTZ undertook a "small dam" construction program in the Dogon country between 1972 and 1984.

As a result of this program and with the concern of making completed dams profitable infrastructure and to promote agricultural production in general, the agricultural extension project in the Dogon country was initiated in July 1985 under tutelage of the National Direction of Agriculture (the current DNAMR) and the Bandiagara district Agricultural Service (current SLACAER).

The overall goal of the project was "Sustainable stabilization of the food supply status and farmer income through autonomous and rational utilization of agricultural potentials".

After a pilot phase (7/85-6/88), an innovation phase (7/89-6/91), an implementation phase (7/91-6/95) and a skills transfer phase (7/95-6/98), a follow-up phase (after project completion) (7/98-6/2000) was implemented.

For this purpose, the PVAPD, in its policy for improvement of agricultural product marketing, conducted a shallot drying test in order to identify a technology that is simple and affordable for the target group. After several tests, the open air-drying technology using trays was selected.

Extension of this technique started in 1990 in 7 villages and progressively extended to 35 villages in 1994-95 (a period which coincided with the start-up of the skills transfer phase). This did not allow PVAPD to increase the number of target groups.

To encourage this activity at farmer level, the project, being aware of the constraints related to the marketing of this new EST product, decided to provide almost all operating costs of the marketing channel, starting from the villages, without involving producers.

Therefore, the PVAPD committed itself to :

- Ensuring quality control at the drying sites before transportation of the product to the central warehouse in Bandiagara, through supervision agents and in collaboration with village association leaders ;
- Providing support to producer groups to weigh the product and record sales ;
- Receiving the products in the warehouse and recording and storing quantities supplied by each group ;
- Carrying-out laboratory analysis of the product ;
- Partially conditioning the product ;
- Contracting economic operators and selling at the warehouse ;
- Repaying BNDA credits and interests ; and
- Replenishing the "equipment amortization" account.

In order to consolidate and ensure sustainability of the achievements, the PVAPD initiated, during the 1993-94 campaign, a process to phase-out from the drying activity, planning for producers to take-over the activity at all stages (production, storage, transportation and marketing).

This process was accompanied by an intensive and targeted training program in literacy and management.

Thus, with the prospect of guaranteeing the precious accomplishments, a follow-up phase from July 1998 through June 2000 was carried-out with the objective of "consolidating self-management capacities for the 35 dryer groups".

Implementation of this phase was entrusted to the NGO AFAR with the SLACAER designated as leading institution for the implementation of field activities.

In conclusion :

"The project left little time to the groups to grow and emancipate" (according to Y. Haïdara, 1998). Adjustment efforts made during the last phase of the project did not help solve the weaknesses that were sometimes serious enough.

One of the major difficulties encountered during project implementation was the complexity of the approach initiated by direct actors that is the producers organized into village associations, considering the stakes/constraints of the economic activity.

3.2 Fresh Shallot Production

3.2.1 Agricultural Aspects :

Shallot cultivation essentially relies on an individual production system around the dams and water basins. Production is performed over three cycles, depending on the areas :

- A first cycle, which starts in September, with harvesting in November-December.

In most cases, producers sell first cycle shallots either fresh or in dried bowls because of the high prices of fresh and shallot bowls.

- A second cycle starting in October, November/December with harvesting scheduled over February/March up to April, depending on the availability of water in the dam basins.

Second cycle shallots are exclusively reserved for transformation into EST or in bowls or mashed and dried shallots, depending on farmers' strategies.

During this period, fresh shallot sales are limited in the production zones. Part of this harvest may be used as seed.

- The third cycle starts in January/February to be harvested in April-May. This production is exclusively reserved for seeding.

See Annex 2 for details on the production schedule.

Evolution of Production

Shallot production has experienced considerable development during the last few years, especially with support from technical assistance organizations.

Table 1 : Evolution of Fresh Shallot Production from 1996 to 2000

Year	Prepared Area (ha)	Yields (T/ha)	Production (T)
1996-97	865	29	25,085
1997-98	803	29	23,287
1998-99	915	31	28,145
1999-2000	1065	31	33,005

Source : SLACAER/Bandiagara

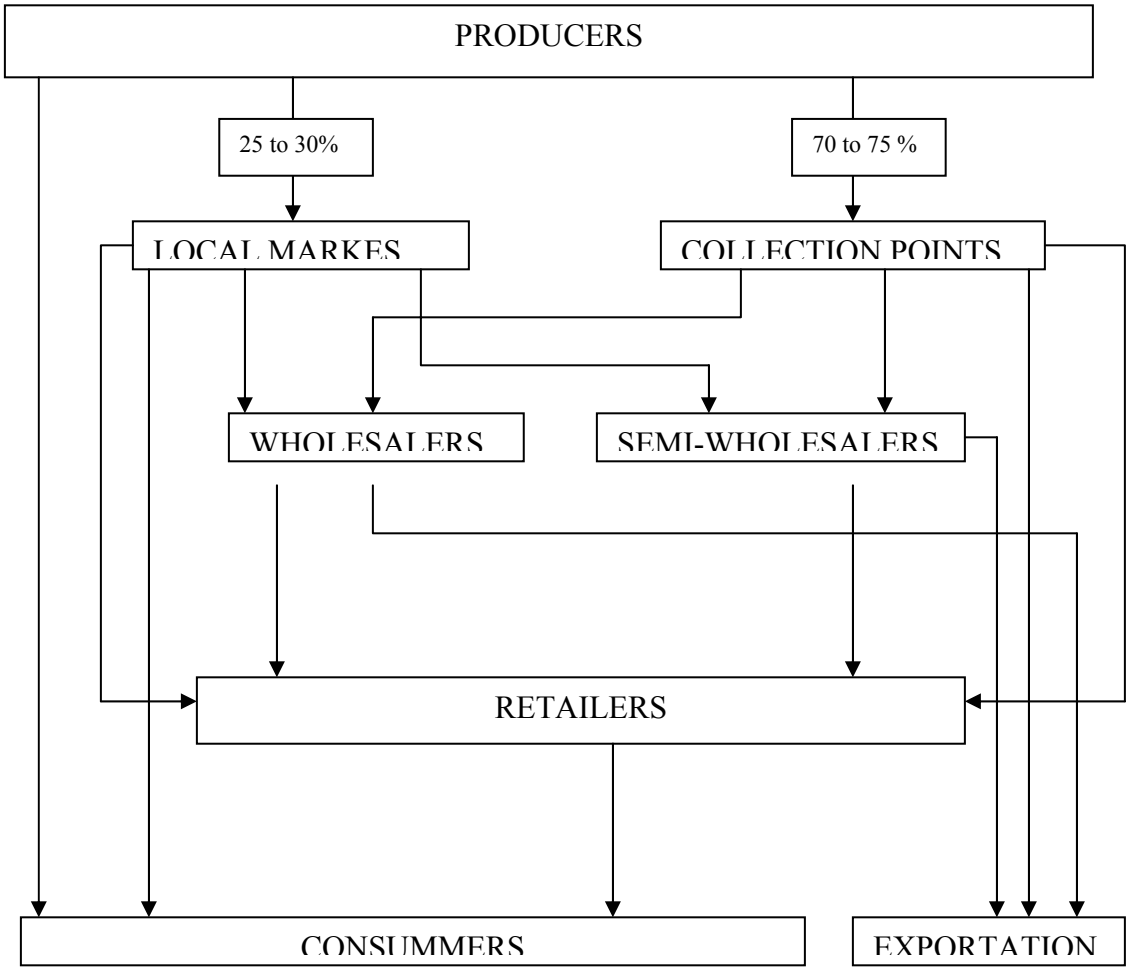
3.2.2 Marketing Strategies :

Although shallot production increased significantly since construction of the dams, Bandiagara has yet kept its traditional marketing channel.

Thus, merchant's travel to markets considered as collection points, which are truly bargaining places.

In fact, merchant often provide credit in the form of cultivation tools, seeds, phytosanitary products and fertilizers. In return, producers are obliged to repay the credits in kind (part or all of their production) after harvests, at prices determined by the merchant.

The following diagram describes the marketing channel for shallots in the Dogon plateau.



Source : PVAPD

3.2.3 Conservation/ Storage :

Fresh shallot conservation methods remain rudimentary and concerns only seeds. In fact, the mission noticed that Dogon farmers' storage strategy does not seek to delay the sale of fresh products, but only to store seeds for which a BNDA credit is given (stored quantities seldom reach 600 Kg per person).

Seeds are conserved in a traditional manner, consisting in storing on bare soil in a corner of the house or in granaries, which are designed for millet storage.

3.2.4 Improved conservation granaries :

These granaries were introduced in some villages by a local NGO, MOLIBEMO, for seed storage. MOLIBEMO would provide credit facilities, up to 20,000 FCFA, to producers who would be willing to adopt (assume ownership of) these granaries. The producer would contribute for other costs such as labor and raw material.

Another technique described in the bibliography indicates that conservation was also performed on iron wire. Considering product quantities and marketing strategy, the mission decided to improve the type of granary described below.

Description of the improved granary (annex 6)

The improved granary is an architectural structure with varying sizes designed for the conservation of shallots.

It is composed of a roof supported by a quadrilateral wall with a door and windows equipped with shelves.

The whole structure rests on a floor separated from the soil by a support whatsoever called basement.

The base of the granary is built on four supporting posts and it's elevation starts with woven laths the upper face of which is coated with mud mortar.

The sizes of the base are 2 m x 2 m.

The walls are 2 m high. The shelves are attached perpendicularly to the walls with 0.4 m intervals between them.

Aeration and entry holes are formed by a 1.5 m x 0.6 m wooden door.

Windows are adjacent to the door and are 0.4 m x 0.25 m sized. A windowless shelf is inserted between two shelves and opposed to a shelf with window.

The roof is conical and covered with thatch and straw.

3.3 Transformation

3.3.1 Various Transformation Methods :

Fresh shallot is transformed as follows :

- Dried shallot bowls,
- Mashed dry shallot,
- Dried shallot slices prepared through the PVAPD process.

a) Dried shallot bowl

This technique consists in mashing the shallot upon rocks with a big pest to obtain a paste. This paste is transformed into bowls and spread upon the rocks for drying. Drying takes about 7 days but this duration may be reduced if needed. This product of high local originality is sold within and outside of the country. It encounters minor competition by the dry mashed shallot, which mainly comes from Niono. Drying yield is 14%.

b) Mashed dry shallot

This is obtained by mashing the shallots in a mortar or upon rocks and leaving them exposed to the sun for drying. This technique is widely used in the Office du Niger area. It requires less effort than transformation into bowls. Drying yield is 18%.

c) Dried shallot slices

Which adds to the range of shallot products from now on, resulted from PVAPD research. The drying technique is simple and consists in cleaning superficial roots properly. The bulbs are then peeled, washed and put into the hopper of the cutting machine where they are cut into fine slices by blades adjusted at 3 mm and operated with a handle. The slices are then spread on trays to be exposed to the sunshine for drying in a sufficiently ventilated place for 7 to 15 days, depending on the period of the year. One kilo of dry product is obtained from an average of 8 kg of fresh product.

3.3.2 Various Upstream/Downstream Transformation Operations :

The steps

Raw Material Supply

Except for women's groups which are supplied by shallot producers, most EST producers directly transform part or all of their fresh products.

Also, some producer groups who undertake only one production cycle per year would buy shallots and dry them. Sometimes, this strategy aims at paying debts contracted by the VA with BNDA which supports pre-financing based on EST production targets.

Screening

Screening is performed to obtain homogeneous products in terms of grade in order to facilitate peeling. The larger bulbs are separated from the smaller ones. The latter, in addition to the peelings, are designed for transformation into bowls or mashed dry shallot. This makes EST an economic product for the producer.

Weighing

This is performed with a weighing machine or a roman scale. It aims at assessing the quantity of product to be transformed.

Peeling

This operation consists in eliminating the root and the spike of the bulb and the first two superficial layers, with an ordinary knife. Whatever the organizational method at the village level, peeling is performed collectively. This operation constitutes the bottleneck of the drying activity, hence its "trickiness" according to producers.

Washing

This operation aims at eliminating all impurities. It is usually done with well water.

Cutting-up

It is performed with a manual cutter. This machine is adjusted at 2 to 3 mm and cuts the onion into fine slices. The slices should be about the same size.

Spreading on the Trays

The product thus cut-up is evenly spread on trays. One tray fits for about 15 kg of onions cut-up. Drying becomes difficult when a tray carries more than 15 kg and the final product has a poor quality (browning).

Drying in the sunshine or in the shade

The product is exposed in the sunshine or in the shade, depending on the drying area selected by the village or on house roofs for villages, which do not have free space and/or have many wandering animals. The drying period ranges from 7 to 15 days according to the periods of the year. The shortest drying period is usually observed in March-April in Bandiagara.

Quality Control

This operation consists in verifying the humidity rate by touching and the presence of impurities. If the texture can be easily broken, then the humidity rate is good for long-term storage. Impurities are screened before conditioning. Usually these are small pieces of wood, tree leaves, dead insects, stones, etc.

Conditioning

The product is packaged into laminated polypropylene bags (120 kg for millet) and tarred at 40 kg of E.S.T. Polypropylene bags doubled with polyethylene, which are appropriate for storage, are not available in the market.

Transportation

Inter-village transportation is usually done with donkey carts. From the villages to Bandiagara, transportation is ensured by private transporters. However, it remains difficult due to the lack of private transporters for certain roads.

Storage
Where there is inter-village consensus, products are stored in area warehouses, which may take up to 10 T of dried products. Packaged products are stored on wooden pallets. For very remote and/or inaccessible villages, the products are stored in village warehouses. This is also the case for villages, which are reluctant to the idea of area warehouses.

The PVAPD constructed 6 area warehouses with 3 to 6 villages sharing one warehouse.

Drying

Drying consists in total elimination of water contained in fresh shallots by exposing them directly to sunshine or spreading cut-up products on trays to be placed in the shade.

Obviously, it is a function of local climatic conditions : wind speed, relative air humidity, sun, sunshine, etc.

3.3.3. Technical Systems :

Equipment used upstream / downstream production

The improved drying technique as developed consists in :

- A manual cutting machine of the "Weisser Rapide 2" type initially designed for potato cutting. It is composed of a hopper, adjustable blades and a handle.
- The tray : onion slices are spread on this material for drying. Its sizes are 1.49 m x 1 m x 0.10 m.
- The holder : a table upon which the cutting machine is mounted.
- Small materials : knives, basins, baskets, plastic pails.
- Weighing machine or roman scale.
- Wooden pallets serving as support for the final product.

3.3.4 Technico-economic Data :

Table 2 :Production equipment amortization

Production Equipment	E.S.T. Production Capacity	Useful Life	Costs in CFA F in 1996
Cutting Machine	1,000 kg/year	7 years	265,000 duty-free
Tray	20 kg/year	2 years	7,000
Weigh		5 years	100,000

Weighing machine		10 years	1,000,000

Source : PVAPD

Drying ratio (Dr) is the ratio of the quantity of dry shallots (D.S.) to the quantity of fresh shallots (FS) placed on the tray : Dr = DS/FS. This ratio is 1/8, meaning that to obtain 1 kg of dry shallots, 8 kg of fresh shallots need to be cut-up.

Drying yield "Y" is the ratio of the quantity of dry shallots (DS) to the total quantity of raw shallots (RS) which is not screened, not cut-up : Y = DS/RS, this yield is 1/10.

Initial Humidity rate (Hi) of the product is Hi = 80%

Final Humidity rate (Hf), after drying, is Hf = 3 to 5%, as indicated by the results of analyses conducted by PVAPD.

Drying duration by cycle : 7 to 15 days
Nominal load by tray : 15 kg of FS
Nominal production capacity by tray : 20 kg of EST/year
Evaporation speed : 76 kg of evaporated water/100 kg of fresh shallots, or an average speed of 9.5 kg of water to be evaporated per day.
Optimum solar drying periods : mid-January through mid-May.

Quantities of EST produced

The evolution of EST production is indicated in the following table. This table shows that the 1999-2000 campaign was the record campaign with a production of 90 tons.

This strength is attributable to the prices of raw materials and of the shallot bowls, which were relatively low, compared with E.S.T. prices. As to the decrease in production in 1998-99, this may be explained, on the one hand, by non-repayment of credits and, on the other hand, by the fact that some villages were affected by the incident that happened to the president of the monitoring committee, who was attacked by looters and lost CFAF 7,532,500 belonging to 5 villages.

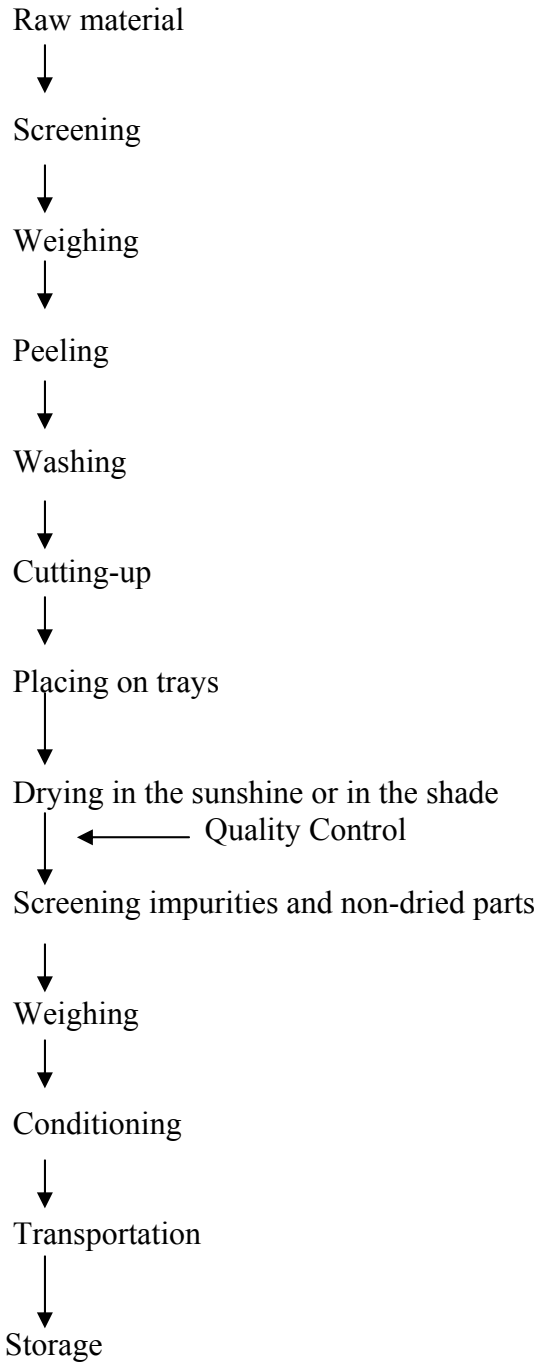
Table 3 : Evolution of E.S.T. Production during the 1988-89 to 1999-2000 Campaigns

Campaigns	88-89	89-90	90-91	91-92	92-93	93-94	94-95	96-97	97-98	98-99	99 - 2000
Quantities produced (kg)	480	15 358	8 716	13 818	21 031	33 000	29 205	40 331	80 000	35 000	90 000
Number of villages involved	1	7	15	15	22	29	35	35	35	35	35
Funding source	PVAPD	PVAPD	BNDA	BNDA	BNDA	BNDA	BNDA	BNDA	BNDA	BNDA	BNDA

Source : PVAPD

NB : Out of 35 villages participating in the activity, 3 have almost ceased activities due to non-repayment of BNDA loans or internal problems at the village level (Bodio, Barou, Ingèlè).
See Annex 9 for an example of E.S.T. production cost breakdown.

E.S.T. Production Diagram



3.3.5. Management of the activity :

Organization on the drying sites

Contrary to fresh shallot cultivation, which is essentially based on an individual production method, E.S.T. production is characterized by high intensity of labor and requires various types of organization at the drying workshops (mainly the peeling link).

The same organizational system exists in almost all villages. Groups are organized either by village, by neighborhood or by family. Transformation materials are collectively owned or belong to the group. The order of priority for equipment use is based on criteria such as age, harvesting period, etc. Women constitute the main labor force for peeling and remuneration varies from village to village.

Farmer Strategy for Transformation Decision-making

Experience in E.S.T. production shows a narrow correlation between price levels for fresh shallots and for shallow bowls at the beginning of the production campaign and the motivation of shallot producers for transformation into E.S.T.

Thus, the lowest price for which the producer decides to transform fresh shallot into E.S.T. ranges between 100 and 115 CFAF/kg for fresh shallots and for the bowl when prices reach the ceiling of 1,000-1,200 CFAF/kg.

This market-based decision also depends on technico-economical parameters of various transformation processes. However, it should be noted that E.S.T. producers continue transforming part of the fresh shallots into traditional products (fermented and dried bowls, mashed dry shallot). These two products which may substitute one for the other may not, in contrast, be substituted to E.S.T.

3.3.6. Quality Control :

Quality control at the village level is performed manually and requires the use of sense organs. This mainly concerns the humidity degree and impurities. Overall, one may notice total full understanding of humidity rate assessment for the final product. However, the presence of impurities in the final product remains a weakness on the part of producers in terms of quality guarantee.

3.4. Marketing

3.4.1. Typology of Actors :

Village Organizations Involved in Marketing

a) Groups

Transformation of fresh shallots into E.S.T. was organized through producer groups referred to as dryer groups.

Traditional at the beginning, these groups experienced a certain dynamic with the intervention of the PVAPD project. Currently, there are 35 dryer groups, including 4 women's groups.

These groups have oral by-laws, the essential points of which are well known but more or less enforced and the tasks are more or less mastered.

b) The Area Committee

Composed of two delegates per group, it serves as intermediary between the groups and the monitoring committee. Its roles include the following :

- Organizing area workshops to set-up a price for the whole campaign ;
- Controlling side-sales ;
- Disseminating information.

The area committee appears as an artificial link, as they meet only to set-up campaign prices.

i/ The Monitoring Committee

Composed of 12 members, 3 of whom are responsible for the organization of the marketing campaign, its operation was seriously affected by the arrest of its president.

Also, the majority of members are illiterate and the tasks and roles are not well understood. This may explain the fact that the committee does not report the balance-sheet to the groups and the refusal by the latter to pay for committee operating costs.

Local Traditional Merchants

Well established in the area, they are generally specialized in the marketing of fresh shallots, dry shallot bowls and mashed dry shallots.

Producers are not only victims of the low prices imposed by merchants but also of truncated weighing materials. It is obvious that the Dogon plateau producers are in weak position vis-à-vis traditional merchants.
For now, there is a proliferation of traditional merchants in the E.S.T. marketing channel. For the 1999-2000 campaign, out of the 23 merchants who participated in E.S.T. marketing, 21 were traditional merchants.

Whereas these traditional merchants have very limited financial resources. This situation should be taken into account when selecting a marketing scenario that preserves producers' interests and ensures sustainability of the drying activity.

Economic Operators

Currently, there are 2 Bamako-based economic operators working in the E.S.T. marketing channel, 1 of whom is a native of Bandiagara. These two major operators have been working in the sector since 1992 and have relatively adequate financial resources. They are :

- Mr. Bamba COULIBALY, co-proprietor of a small plant for meat, fruit and vegetable drying complemented with a small packhouse. He is acting as both wholesaler, semi-wholesaler and retailer.

- Mr. Sana NANTOUME, wholesale merchant at Bagadadji market place in Bamako, he has good knowledge of the area and the upstream network for fresh shallot and traditionally transformed product supply. In addition, he acts as transporter.

Retail Sellers

Constitute the main actors at the final stage of marketing. Usually, these are household women or merchants who act as middlemen between wholesalers or semi-wholesalers and consumers to breakdown sale places.

Organizations Working in the Sector

The SLACAER

Ensures the dissemination of technical themes in the fields of rainy season production and market-gardening as well as farmer training.

The SLACAER, through its Farmer Organization Officer ("COP"), is responsible for preparing and submitting credit application dossiers to BNDA. He acts as moral guarantee between BNDA and the producer groups. The heavy administrative channel of SLACAER often causes delays in credit supply.

The SLACAER has limited human and financial resources.

BNDA

BNDA has been collaborating with producer groups for E.S.T. marketing since the 1991-92 campaign. To this effect, a credit line was set-up for dry onion marketing. Credit repayment period is one year with 11% interest rate. Financial support for the 1999-2000 campaign for the entire production area was as follows :

Amount projected : CFA 90,000,000
Amount disbursed : CFA 79,000,000

Repayment rates range between 98-99%.

However, making credit available on a timely basis remains an issue. Delays may be explained by the following factors :

- Delays in previous loan reimbursement on the part of producer groups ;
- Delays in the organization of price determination workshops which serve as basis for the preparation of loan application dossiers ;
- Slowness in the processing of credit dossiers by BNDA (applications for amounts exceeding 2,000,000 CFA must be processed in Bamako) ; and
- Administrative slowness at the SLACAER, which presently lacks adequate resources due to project phase-out.

3.4.2 E.S.T. Pricing :

The fixed-price system was adopted by the producers due to the weakness of farmer organizations and their negotiation power with merchants. The price is determined during a general assembly of producers and economic operators. Prior discussions among producers at village level are held to propose a price per zone.

The area committee holds 6 area workshops and then prices are harmonized during a producer central meeting in Bandiagara. This price serves a basis for negotiations with the merchants. By the end of negotiations, the consensus agreed between the two parties remains the price for entire campaign.

3.4.3 Current Marketing Channel :

The following table summarizes the current E.S.T. marketing channel.

Table 4 : E.S.T. Current Marketing Channel

Actors	*Activities*	Type of Support	Organization
Producers and / or Fresh shallot buyers	- Individual production or purchase of fresh shallots - Individual production of EST - Sale to the village group	Agricultural Extension	SLACAER
Group	- Data collection for loan application preparation - Loan disbursement in Bandiagara - Organization of the drying workshops - Purchase of individual production - QUALITY CONTROL - Stock recording - Transportation of E.S.T. to area warehouse if necessary - Storage		
SLACAER /AFAR	- Preparation of credit dossiers - Submission of the dossiers to BNDA - Monitoring groups to receive credit - Training in management record keeping	Technical Approval (approval of applications)	DRAMR
BNDA	- Making credit available in Bandiagara		
Area Committee and area warehouse management committee	- Dissemination of information among the group - Organization of campaign price determination workshop - Area warehouse management (Stock and sale by the group) - Controlling side sales - Supplying packaging bags		
Monitoring Committee	- Organizing GA meeting to determine prices between producers and E.O. - Data collection on available stocks - Potential client identification - Dispatching stock - Monitoring credit with merchants		

	- Transporting E.S.T to area warehouse or from Bandiagara to Bamako		
Economic operators local merchants Retailers	- Purchase in credit or cash - Distribution • Bandiagara • Bamako (Médine market or Niono bus station) - packaging in small bags - Sales	Purchase and sale to the group	

NB : Out of a total production of 90 tons of E.S.T. in 2000, 78 tons were sold by the monitoring committee and 12 were sold through the parallel channel which did not often enforce the price determined for the campaign. This often caused disorganization of the existing channel.

3.4.4. Market Policies :

Limited duration of this consultation mission did not allow for an actual market survey. However, the mission was able to collect the following data:

Supply

After PVAPD project phased-out, producers' efforts focused on progressive increase of transformed quantities. Thus, the spreading of the activity in the area (neighboring villages joining in) translated into the production of 90 tons of E.S.T. during the 2000 campaign.

Area and village warehouses serve as supply sources for various actors (see Table 3).

Demand

The Médine market and the Niono bus station in Bamako are the main outlet markets for E.S.T. originating from the Dogon plateau. These markets supply other markets in Bamako. Actors are semi-wholesalers, wholesalers and retailers.

Results of the survey conducted by the PVAPD in 1996 described the typology of E.S.T. sector operators in the Dogon plateau as follows :

- local operators who sell their products in Bandiagara or Sévaré (Mopti) ;
- Bamako-based operators originating from the Dogon plateau, who constitute a commercial network between Bamako and Bandiagara, are established, for the majority, in the Médine market ;
- Operators using the Niono-Bamako road who sell E.S.T. as a complement to their product lines ;

- The USISS, a plant for meat, fruit and vegetable transformation, buys E.S.T. In bulk and re-sells it after packaging, to supermarkets or their usual clients.

In conclusion, the two main outlet markets for E.S.T. throughout Mali remain Bamako and Mopti. Quantities exported to sub-regional countries are unknown.

The Market Information System

There is no formal information channel about market-gardening product prices in Bandiagara. Only merchants have information about Bamako markets through telephone contacts or private transporters coming from Bamako. This places producers in a weak position compared to merchants.

It is important to mention that by the last phase of the PVAPD project, the mercury prices through the rural radio for shallot-based products for Bamako, Niono and Bandiagara main markets was broadcast twice a week. Price information collection and dissemination was supported by PVAPD.

IV. Various Constraints in the Sector

4.1 At the transformation level

- Lack of appropriate facilities (Workshop) to carry-out upstream operations ;
- Limited technical system for drying :

- Quantity,
- Quality,
- Duration.

- Tricky and fastidious peeling work ;
- Inadequate packaging ;
- Inadequate equipment (trays, cutting machines) and often in bad conditions ;
- Lack of supply source for cutting machines, spare parts and plastic mosquito nets at the national level ;
- Lack of monitoring/supervision ;
- Lack of specifications for E.S.T.;
- Lack of infrastructure (electricity, water) in production areas ;
- Inaccessibility of certain villages, impassable roads.

4.2 At the Level of Marketing/Distribution

- Lack of a sound marketing strategy ;
- Lack of strategic human resources ;
- Lack of price information system ;
- Competition with fresh shallots in the market ;
- Reluctance of groups for product storage (inter-village conflicts) ;
- Lack of actual private promoters.

4.3 At the Level of Fresh Product Conservation

- Lack of monitoring mechanisms and facilities ;
- Non-enforcement of blueprints for the construction of conservation huts (orientation, openings, ventilation and upstream/downstream operations, etc.) ;
- Early sale of seeds serving as economic opportunities ;
- Weak purchase power for producers, which may restrict their technical choices.

4.4 At the Level of Activity Organization/Management

- Very low level of literacy and management skills (out of 153 persons trained, only 25% are able to keep management records, according to the "Follow-up Phase Evaluation Report";
- Low level of organization which results in misunderstanding of roles among organizations ;
- Inadequate operation of the monitoring committee: there is a lack of confidence between the board and certain groups ;
- Low skills level to assessment productive projects ;
- Inadequate skills level to assess and apply actual production costs.

4.5 At the Level Fresh Shallot Production

- Unavailability of water and land ;
- Archaic watering system (using traditional gourds).

V. Shallot Sector Analysis

5.1 At the Transformation Level

Upstream and downstream operations are defined as a chain of operations on the product before and after drying. Even though these operations are well-understood in general, there are issues related to hygiene and production best practice.

Hence, the need for training or re-training on production best practice and hygiene.

It should be noted that E.S.T. sub-products are fully used, which adds to product valorization. However, technologies used remain traditional ones. The material used for E.S.T. production represents an actual innovation, compared to traditional methods.

In addition, producers benefit from an impressing technical heritage composed of about 5,000 trays, one hundred cutting machines, fifty scales and weighing machines and storage warehouses constructed with support from the PVAPD.

Despite existence of these materials, the insufficiency of cutting machines and trays was strongly voiced by the groups visited by the mission.

The case of cutting machines deserves further consideration because, in the opinion of producers, having surplus materials constitutes an easy solution to avoid reflection on a better organizational method, without considering cost-effectiveness issues.

Cutting machines were manufactured locally in order to minimize their costs and make them affordable. These did not prove successful as they necessitate permanent maintenance.
It should be reminded that the cutting machines were imported from Germany by the project and therefore were not locally available.

Unavailability of the Hostallen-type mosquito net, which is more resistant than the local one raises the issue of searching for a supplier, yet to be identified after project completion.

There are constraints to solar drying as it depends very much on climatic conditions. Drying duration ranges between 7 and 15 days. To resolve this constraint, thermal input and forced ventilation are technical alternative solutions that need to be validated, however, in the context of Dogon country socio-economic conditions.

However, this technological choice may be envisaged only on the basis of characteristics of the technical equipment proposed and replicability criteria.

An overall sector approach needs to be considered with the drying system as focal point of the following six components upstream, downstream, external setting, energy, construction, utilization. The market remains the priority.

5.2 Organization

Producer organization was supported by the PVAPD through animation activities, which helped the project introduce a certain dynamic. From typical farmer organization, there is a tendency towards a certain type of cooperative through the establishment of a monitoring committee representing the 35 villages.

Despite limited resources, this committee was able to ensure E.S.T. marketing after project phase-out without having a juridical identity. It should be recalled that this monitoring committee is not a formal organization.

The arrest of the monitoring committee chairman following the looting of 7,500,000 CFA, representing the pre-financed revenue of E.S.T. sales, has caused inadequate operation of the committee.

Certain villages, because they do not feel confidant, fearing that returns from E.S.T. sales may be blocked to reimburse this debt, have initiated parallel direct sale channels. Villages concerned with the loss of this money find themselves in a difficult position with the bank, which demands repayment of the previous debt as condition for new campaign loans. **This is a major risk for the sector**. During the mission, it was promised that the committee board would be renewed.

Poor economic conditions and delays in bank loan supply contribute in the disorganization of the channel (parallel sales with non-enforcement of determined prices). Delays in the submission of loan application dossiers puts producers in a precarious treasury situation at the merci of speculating merchants.

This slowness is due to inadequate organization among the groups but also poor administrative practice within the SLACAER technical structure, which is responsible for transmitting loan application dossiers to BNDA.

Therefore, pre-financing the E.S.T. marketing is an unavoidable element in the sector due to producers' low purchase power.

The organizational constraints are also due to the illiteracy of groups' board members. Illiteracy rate in this area is very high. Due to ignorance, certain actual costs are not taken into account in the E.S.T. price structure. Drying equipment is not systematically maintained and replaced.

The provision of loans by the banks confirm the importance of this sector. This interest is even more justified since repayment rates reach 98%.

Self-managed village savings and credit clubs constitute an ideal funding source, but the minimum interest rate enforced in the Dogon plateau is 20% against 11% for BNDA. The mission recommends improvement of the BNDA/producer partnership instead of searching for other partners, considering the interest rate in force and experience already gained.

5.3 Marketing/Distribution

E.S.T. is a product that enjoys a Dogon country origin. Improvement of the drying technique helped obtain acceptable quality dry product. The distribution channel exists but it is essentially geared towards Bamako.

Without a commercial strategy, the product is unknown or little known in other parts of the country. Lack of a unique place and equipment for conditioning affects product quality and traceability.

The lack of private professional actors in the sector hampers establishment of effective production, distribution and promotion policies.

After completion of the project, mercury price is no longer ensured, thus weakening the established system. By lack of price information, producers find themselves in a weak position to negotiate with merchants.

It should be noted that fresh shallot is a product that serious competes with E.S.T. Its permanent availability in the market make E.S.T. marketing/sales very slow.

5.4 Analysis of the Storage/Conservation System

Although producers express a relatively high level of satisfaction with the improved granary, it should be noted that technical improvement is needed for current versions. Such improvement will concern the ventilation system, the size of openings, orientation of the device and the quality of materials to be used.

However, the mission mentioned the lack of reliable data about these conservation huts, which may be adaptable in the area. Several huts were replicated by the farmers themselves. Therefore, improvement is necessary to adapt a product that meets expectations and capacities of these actors to ensure ownership over them while testing other models.

5.5 At the Level Fresh Products

Shallot production in the Bandiagara area reaches 30,000 tons and is constantly increasing, despite the use traditional production means and unavailability of land. Only 2% of total production is transformed into E.S.T.

Increased cultivation area translates into increased production, which is not followed by increased yields, currently estimated at 30 tons per hectare. In addition, unavailability of water in dams' basins was mentioned as a constraint that seriously hampers production.

VI. Recommandations / Conclusions

Considering the current level of farmer organization and high illiteracy rate in the area, it would be difficult to envisage proper operation of the E.S.T. marketing channel without adequate understanding of simple management procedures by the groups and members of the monitoring committee.

It is therefore important for CAE to focus its efforts, during the next three years, on the consolidation of accomplishments with the groups, based on the training plan developed below and to encourage emergence of at least 2 private operators in order to better support the shallot sector as a whole.

The mission therefore recommended the following main priority actions.

Overall support activities to the sector

- To help set-up specifications defining quality criteria ;
- To investigate a greater capacity cutting machine while ensuring its availability at the local level ;
- To organize exchange visits within the country and in the sub-region with producers and private operators ;
- To investigate for an adequate packaging material which would prevent water in-take ;
- To establish a market information system and ensure its dissemination among producers ;

- To encourage establishment of a discussion forum among various actors in the shallot sector ;
- To establish a logo, a quality label for E.S.T./research for packaging research ;
- To develop a communications strategy (Open Door Day, TV, Radio, broadcast on culinary receipts, exhibits, newsletter, national, regional and international fairs, billboards). See detailed proposal ;
- To conduct a market survey in order to better target promising markets ;
- To investigate on a more efficient technology for onion peeling (a constraint factor to production) ;
- To investigate on the possibility to improve traditional technologies for shallot-based products, as these play a very important role in the sector.

At the level of current producers

- To identify/select an organization which can provide adequate support to various farmer organizations ;
- To provide training to E.S.T. producers on hygiene and production best practice before the beginning of the 2001 campaign ;
- To facilitate equipment supply to other villages engaged in the activity which lack technical resources in order to avoid competition with improved dry products ;
- To raise awareness among producers on equipment maintenance and replacement ;
- To improve the resistance of trays through investigation on wooden covers ("fraquet") and ensure availability/affordability at the local level ;
- To support the development and enforcement of organizational by-laws among the groups ;
- To build capacities among monitoring committee members through adequate institutional support in order to achieve progress towards establishment of an umbrella organization ;
- To encourage conditioning by a private operator, who is already involved in the distribution channel, as of the 2001 campaign ;
- To identify seed production villages for comparative tests on improved fresh shallot conservation huts.

At the level of a private promoter

- To introduce a more performing technical system and adapt it to the realities in the area in order to increase production capacities ;
- To encourage competent private operators to provide support to the marketing channel ;
- To plan for a real situation test for drying (pilot drying plant) ;
- To conduct a feasibility study for establishment of a semi-industrial plant for shallot drying.

NB : Mr. Bamba Coulibaly (tel 21-84-27) at USISS is available to conduct the test.

VII. Proposals

As a result of the mission, two scenarios may be envisaged :

1) To initiate a pilot project with the 35 dryer groups.
2) To initiate a pilot project with a private operator and ensure support to current producer villages in the following areas : training in literacy, management, organization and production, hygiene and marketing best practice.

The mission was interested in scenario 2 for the following reasons :

- Inadequate capacity of current producers to conduct a productive project with high technicality and high investment ;
- The need to reinforce current accomplishments in the sector ;
- The need for professionalization in the sector, considering existing economic stakes and market constraints ;
- However, the following proposals remain at the stage of more in-depth reflection.

7.1 Technical Alternatives for Shallot Drying – Advantages and Constraints

For technology selection, a global sector approach needs to be considered with the drying system as focus of the following six components: upstream, downstream, external setting, energy, construction, utilization.

There is no specific Shallot Dryer, but rather, systems to be adapted considering the above listed components.

Therefore, a feasibility study seems to be necessary with someone who has a project, in order to better refine the choice and technical solutions to be adapted. However, the following few alternatives may be possible solutions.

Table 5 : Description of the dryers

Description	Advantages	Constraint
ATESTA Cabin Dryer Energy source : gas Vertical and natural convection Products are spread on trays which are placed one on top of the other for drying Drying capacity : 100KG	Can be entirely manufactured locally Low manufacturing costs Possibility to install several dryers	Gas consumption Necessitates a shelter Necessitates close surveillance during the drying
Passiflore-type dryer Energy source : solar and thermal supplement as options The roof of a building serves as sunshine catcher. Hot air goes through the ceilings and the roof and is aspirated by an under-	Utilization of solar energy or voluntary thermal supplement	Necessitates sizing efforts Prior engineering Necessitates training to perform the drying Maintenance costs Imported ventilation generator Operation of the ventilation

ground channel to direct it to the dryer. Adjustable capacity and higher than 600 Kg / cycle Manual thermal adjustment		generator with electricity Necessitates close surveillance during the drying
Maxicoq Dryer Heating system : Solar and gas mixture It is a large shell dryer composed of a metal cock painted in black in which the trays are piled. A ramp burner helps heat the air at the bottom of the dryer. Natural and vertical convection. Products are spread for drying on trays that are piled one on top of the other.	Can be entirely manufactured locally Low manufacturing costs Mixed solar and gas drying Mobile dryer Can be entirely manufactured locally Natural convection Manual thermal adjustment	Manual thermal adjustment Necessitates some training Tray maintenance costs Necessitates a shelter Necessitates close surveillance during the drying

For shallot conservation

- To conduct comparative tests between conservation of IBE, IVERA and RETAIL type seeds. (See annexes for other prototypes)

7.2 Proposals for Improvement over the Existing Granary

- Nature of construction materials: mud bricks instead of stones, making the least use of stones, coating with mud mortar.
- Review the aeration system either by increasing the number of windows or by facilitating air circulation.
- For implantation, consider main wind orientation in order to facilitate air circulation.
- Taking the environment into account, avoiding termite areas and waste deposits.
- To reconsider the design of shelves which should be correctly horizontal and resistant enough to support the weight.
- To coat the floor in order to obtain a more stable space.
- To reconsider harvesting and selection techniques for shallots designed for seeding.
- To reconsider multiple layer storage techniques.
- Monitoring storage in order to remove rotting bulbs. See Annex 11 for other system blueprints.
- To identify villages which can host pilot projects for dissemination of the adopted model.
- To train producers on hygiene and conservation best practice.
- To define specifications.
- To develop a monitoring system for at least two (2) agricultural campaigns.
- To organize exchange visits in sub-regional countries (Niger) with good reputation for onion conservation.

7.3 Training Plan for Current Producer Groups

7.3.1 Training themes :

Module(1) Production and hygiene best practice

- Hygiene, environment, Product, Body, material.

Production	Raw material selection
Upstream drying	Washing
	Cutting-up
	Screening
	Weighing
	Placing on trays
	Drying
	Appreciation criteria at the end of drying
	Screening / classification
	Packaging/Storage
	Quality control.

Module (2) Organization

- Organizational training
- Operation
- Conflict management
- Statutes and by-laws
- Formalizing procedures
- Roles and tasks

Module(3) Management

- Accounting
- Petty cash keeping/Stock
- Banking channel / Savings/ Credit

Module(4) Literacy

Module (5) Marketing

7.3.2 Contents of Training Themes for Producer Groups :

Modules	Content	Method	Target Group	Duration
Production and Hygiene Best Practice PHBP	• Notions of quality characteristics of a quality product, its importance • Various operations in E.S.T. production and their importance • Identifying contamination sources • Hygiene rules to be enforced for : raw materials, producers, equipment, production workshops. • Quality criteria and quality control procedures • Conditioning and storage best practice	Brainstorming Working groups Demonstration sessions	Producer groups, group board members	Depending on E.S.T. production schedule
Banking Channel	• Bank loan management • Understanding major loan conditions (interest rates, deadlines, penalties) • Preparation of a loan application dossier • Account operations	Discuss with BNDA	Group board members	December
Simple Accounting	• Retraining in management record keeping • Literacy and numeracy • Calculations using the four operations • Using the calculator • Management record keeping	Discuss with a specialized consulting firm	Group board members	Depending on consulting firm
Organization	• Operating methods of groups • Roles and tasks of group board members • Formalization procedures (choosing the best form of organization) • Conflict management	Discuss with a specialized consulting firm	Group board members	Depending on consulting firm
Literacy	• Spelling some frequently used words in the activity • Learning how to read some key-words • Capacity building for recording • Analysis capacity building	Discuss with a specialized consulting firm	Group board members	Depending on consulting firm
Marketing	• Market identification • Marketing technique • Selecting distribution channels • Client retention • Negotiating with economic operators	Discuss with a specialized consulting firm	Monitoring committee	Depending on consulting firm

NB: Take into account dialect diversity for all training modules. The same applies to producers' agricultural calendar.

7.4 Communication Strategy

SUMMARY TABLE OF PROPOSED STRATEGIES IN THREE MARKETS

Action to be planned for per type of market	Urban Well-off and catering	Popular Urban and rural	Sub-Regional Market
Product EST	First quality EST	- First quality E.S.T - 2nd quality E.S.T	First quality E.S.T.
Price	- Harmonize prices - Reconsider cost price	- Set prices per zone, getting close to local prices - Reconsider cost price	- Negotiate the conditions - Revise prices considering the costs
Conditioning	-Logo/ label - Double layer polypropylene packaging - Printed packaging bag/Sachet - 40kg bags - 100-5OO g polypropylene sachets - Packaging in a single packhouse	- Packaging sachets, printed or not - Packaging in a single packhouse	- Double layer polypropylene packaging Printed packaging sachet
Distribution	- Ensured by professional sellers - Shops − Supermarkets −Services	- Dry condiment retail sellers in local markets	- Fruit and vegetable export trade - Fish export trade
Promotion	- Free-of-charge distribution - Posters - Sports, TV, Radio - Culinary demonstration sessions - Take advantage of sporting events - Participation in major fairs	- Sample deposit - Spots TV, local radio broadcasting in national languages	- TV - Participation in sub-regional fair exhibits - Embassies - Leaflet/Other - Restaurants and “maquis”

7.5 Programming Shallot Sector Support Activities

ACTIVITIES	ACHIEVEMENT	PUBLIC	AN I	AN II	AN III
Establishing a close monitoring and supervision system	CAE	GPT			
Recruiting PHBP individual or training firms	CAE/MT				
Training session for supervisory staff	MT	AGT			
PHBP training session for producers	MT	GPT			
	MT	Art			
Training for woodworkers/joiners on equipment maintenance					
Investigation for typically adapted equipment (Suppliers)					
	AT/MT/CAE				
Cutting machine					
Tray frames	AT/MT/CAE				
	AT/MT/CAE				
Mosquito net					
Support to supplemental equipment					
TECHNICAL INNOVATION TESTS (DRYERS AND HUTS)					
Identifying pilot project villages	CAE	GRP			
Identifying promoters to establish the plant	CAE	Pr			
Analysis of data collected in the field	AT/MT	Pr			
Feasibility study	CAE	Provider			
Contracting	CAE				
Designing/ sizing selected equipment	AT				
Validation technique	AT/REEG/MT				
Implementing techniques systems	AT/REEG/Pr/MT				
Launch /selection service provider bids	AT/CAE				
Mounting/trial	AT/MT/CAE/Pro				
Training in production techniques	AT/ MT/Pr				
Monitoring and capitalization	AT/CAE/MT				

ORGANIZATION			
Refining monitoring committee needs assessment	Provider	CS	
Support to professionalization in the sector	CAE	GPT/Pr	
Support to organizational group formalization	CAE/PRO.	GRP/MC	
Organizing inter-group visits	CAE/PRO.	GRP	
Organizing exchange visits in the sub-region	CAE/PRO.		
TRAINING			
Developing TORs for the following themes and modules	CAE		
Farmer organization, management, marketing, PHBP			
Conducting training sessions			
Literacy	Provider	GRP/MC	
Management	CAE/PRO.	GRP/MC	
Farmer organization	PROVIDER	GRP/MC	
Marketing	CAE/PRO.	MC	
MARKETING – DISTRIBUTION – INFORMATION			
Market information system			
Identifying a market data collection organization	CAE		
Dissemination of information among producers	CAE/Provider		
Establishing or reinforcing a discussion forum for	MT		
For various actors in the sector			
Investigating adequate packaging	CAE		
Terms of reference for appropriate communication and market survey tools	CAE		
(radio and TV advertisement, research for slogans…..)			
Invitation to bid for communication tools	CAE		
Designing advertising messages	Service provider		
Negotiating with national media for dissemination	CAE		
Developing other tools (banderoles, console, market animation	Service provider		
Posters, permanent billboards, leaflets on receipts…..)			
Promotion campaign/Communication	CAE/CS/Pr		
EVALUATION OF THE SUPPORT PROGRAM	**AT/MT/ CAE**		

MC : Monitoring Committee

FAgt : Field Agents

REEG : Renewable Energy and Environment Group

Pro. : Provider

CAE : Centre Agro – Entreprise

Pr : Promoter

AT : Alain T

MT : Mariétou

GRP : Group

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List of annexes